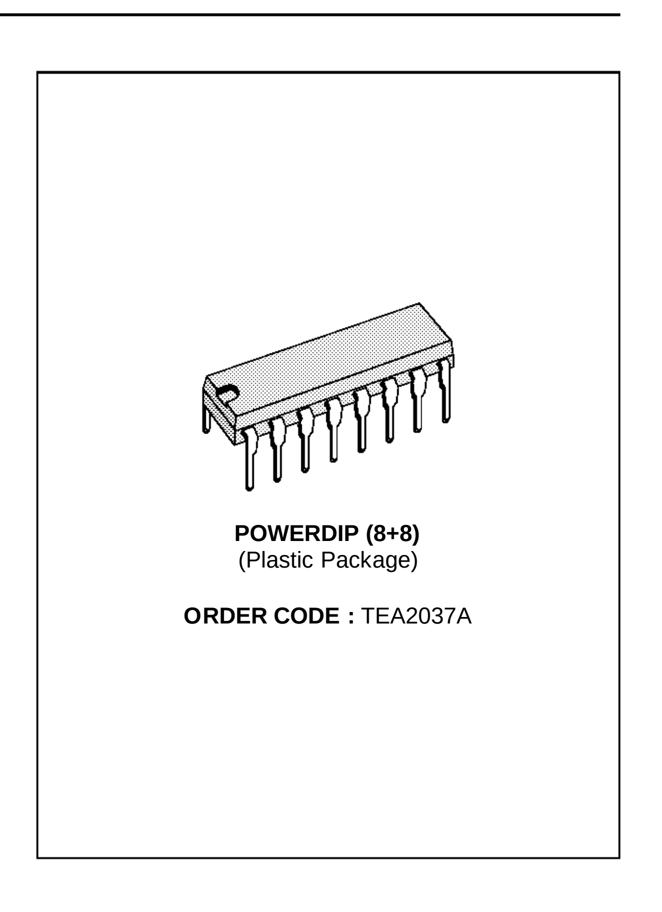


TEA2037A

HORIZONTAL AND VERTICAL DEFLECTION MONITOR

- DIRECT LINE DARLINGTON DRIVE
- DIRECT FRAME-YOKE DRIVE (± 1A)
- COMPOSITE VIDEO SIGNAL INPUT CAPABILITY
- FRAME OUTPUT PROTECTION AGAINST SHORT CIRCUITS
- PLL
- HORIZONTAL OSCILLATOR FREQUENCY RANGE FROM 15kHz TO 100kHz
- VERTICAL OSCILLATOR FREQUENCY RANGE FROM 30Hz TO 120Hz
- VERY FEW EXTERNAL COMPONENT
- VERY LOW COST POWER PACKAGE



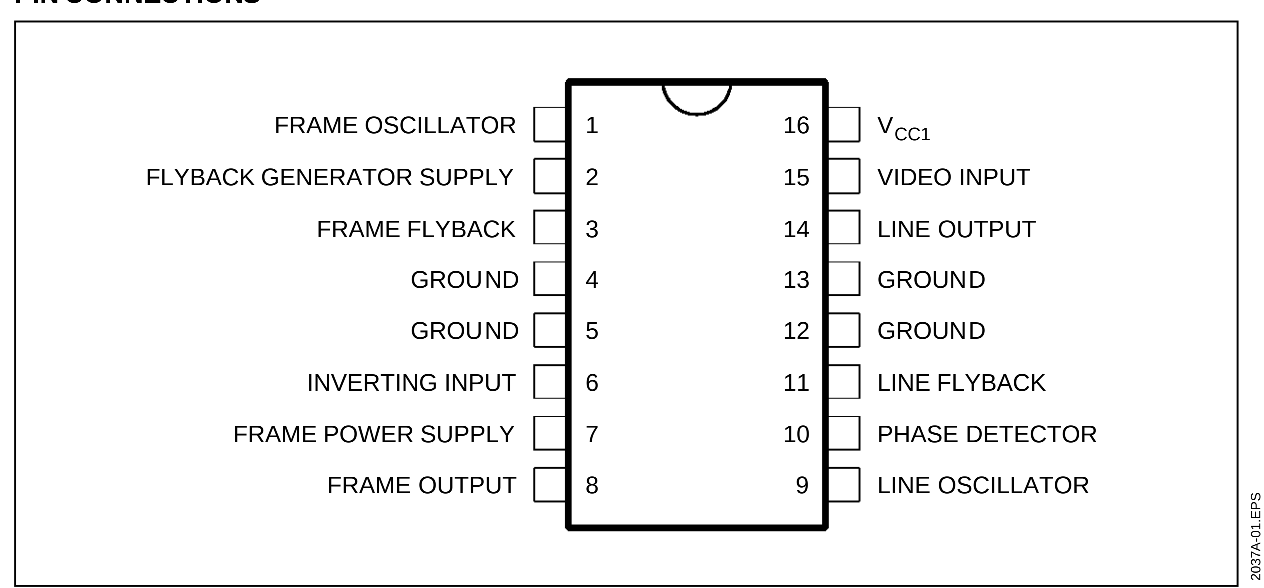
POWERDIP (8+8)
(Plastic Package)

ORDER CODE : TEA2037A

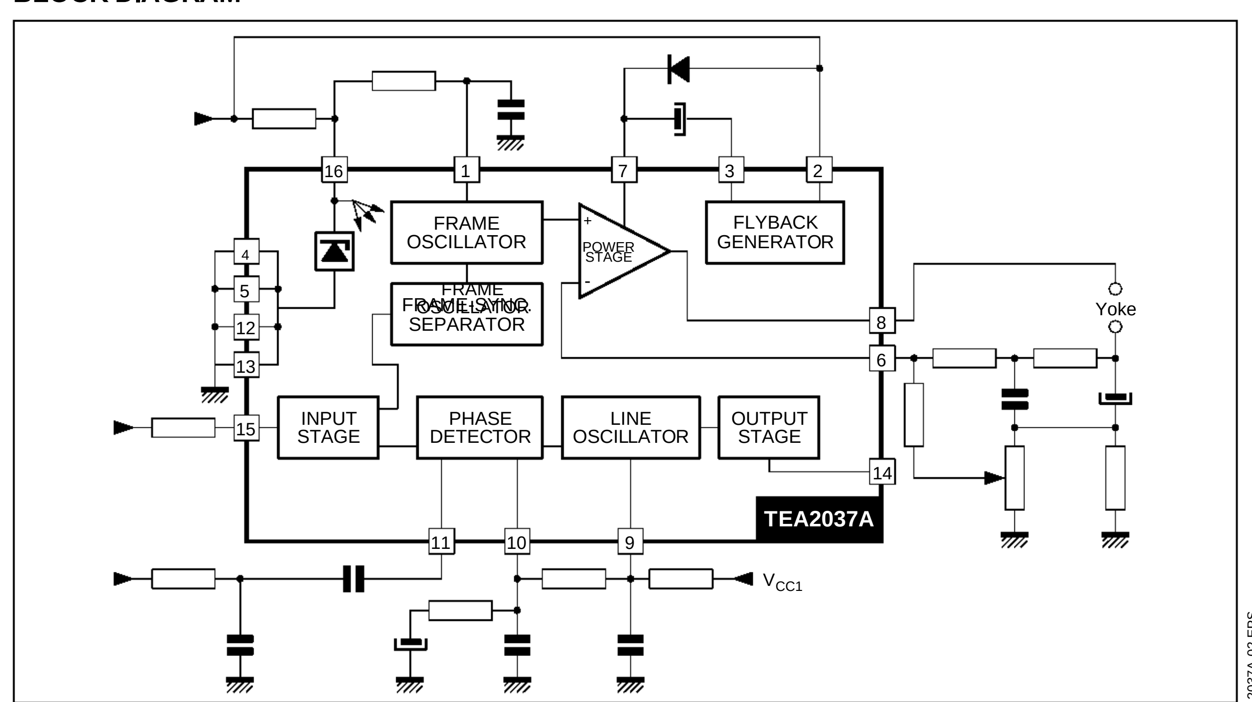
DESCRIPTION

The TEA2037A is an horizontal and vertical deflection circuit. It uses the same concept as TEA2117 but optimised for small screens, for a very low cost solution.

PIN CONNECTIONS



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC1}	Supply Voltage	30	V
V_2	Flybcak Generator Supply Voltage	35	V
V_7	Frame Power Supply Voltage	60	V
I_{8nr}	Frame Output Current (non repetitive)	± 1.5	A
I_8	Frame Output Current (continuous)	± 1	A
V_{14}	Line Output Voltage (external)	60	V
I_{p14}	Line Output Peak Current	0.8	A
I_{C14}	Line Output Continuous Current	0.4	A
T_{stg}	Storage Temperature	-40, +150	^oC
T_j	Max. Operating Junction Temperature	+150	^oC

2037A-01.TBL

THERMAL DATA

Symbol	Parameter		Value	Unit
$R_{th\ (j-c)}$	Junction-case Thermal Resistance	Max.	15	$^oC/W$
$R_{th\ (j-a)}$	Junction-ambient Thermal Resistance (soldered on a 35µm thick 45cm^2 PC board copper area)	Typ.	45	$^oC/W$
T_j	Recommended Junction Temperature	Max.	120	^oC

2037A-02.TBL

ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^oC$)

Symbol	Parameter	Min.	Typ.	Max.	Unit
SUPPLY (shunt regulator) (Pin 16)					
I_{CC1}	Supply Current	10		20	mA
V_{CC1} ΔV_{CC1}	Supply Voltage (I_{CC1} = 15mA) Voltage Variation (I_{CC1} : 10mA to 20mA)	9 -280	9.8 50	10.5 +280	V mV
LPS	Starting Threshold for Line Output Pulses			5	V

2037A-03.TBL

ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C) (continued)

Symbol	Parameter	Min.	Typ.	Max.	Unit
VIDEO INPUT (Pin 15)					
V_{15}	Reference Voltage (I_{15} = -1μA)	1.4	1.75	2	V
MWF	Minimum Width of Frame Pulse (when synchronized with TTL Signal)	50			μs
V_{IN}	Sync Bottom to Black Level ($R_{SYNC\ 15}$ = 560kΩ)	0.2	0.3		V_{PP}
LINE OSCILLATOR (Pin 9)					
LT9	Low Threshold Voltage	2.8	3.2	3.6	V
HT9	High Threshold Voltage	5.4	6.6	7.8	V
BI9	Bias Current		100		nA
DR9	Discharge Impedance	1.0	1.4	1.8	kΩ
FLP1	Free Running Line Period (R = 34.9kΩ Tied to V_{CC1}, C = 2.2nF Tied to Ground)	62	64	66	μs
FLP2	Free Running Line Period (R = 13.7kΩ, C = 2.2nF)		27		μs
OT9	Oscillator Threshold for Line Output Pulse Triggering		4.6		V
$\frac{\Delta F}{\Delta \theta}$	Horizontal Frequency Drift with Temperature (see application Fig. 8)		2		Hz/°C
LINE OUTPUT (Pin 14)					
LV14	Saturation Voltage (I_{14} = 200mA)		1.1	1.6	V
OPW	Output Pulse Width (line period = 64μs)	20	22	24	μs
LINE FLYBACK INPUT (Pin 11)					
V_{11}	Bias Voltage	1.8	2.4	3.2	V
Z11	Input Impedance	4.5	5.8	8	kΩ
PHASE DETECTOR					
I_{10}	Output CUrrent during Synchro Pulse	250	450	800	μA
RI10	Current Ratio (positive/negative)	0.95	1	1.05	
LI10	Leakage Current	-2		+2	μA
CV10	Control Range Voltage	2.60		7.10	V
FRAME OSCILLATOR (PIn 1)					
LT1	Low Threshold Voltage	1.6	2.0	2.3	V
HT1	High Threshold Voltage	2.6	3.1	3.6	V
BI1	Bias Current		30		nA
DR1	Discharge Impedance	300	470	700	kΩ
FFP1	Free Running Line Period (R = 845kΩ Tied to V_{CC1}, C = 180nF Tied to Ground)	20.5	23	25	ms
MFP	Minimum Frame Period (I_{15} = -100μA) (with the same RC)		12.8		ms
FFP2	Free Running Line Period (R = 408kΩ, C = 220nF)		14.3		ms
FPR	Frame Period Ratio =	1.7	1.8	1.9	
FG	Frame Saw-tooth Gain between Pin 1 and non-inverting Input of the Frame Amplifier		-0.4		
$\frac{\Delta F}{\Delta \theta}$	Vertical Frequency Drift with Temperature (see application Fig. 8)		$4 \cdot 10^{-3}$		Hz/°C
FRAME POWER SUPPLY (Pin 7)					
V_7	Operating Voltage (with flyback generator)	10		58	V
I_7	Supply Current (V_7 = 30V)			22	mA
FLYBACK GENERATOR SUPPLY (PIn 2)					
V_2	Operating Voltage	10		30	V

2037A-04.TBL



ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^oC$) (continued)

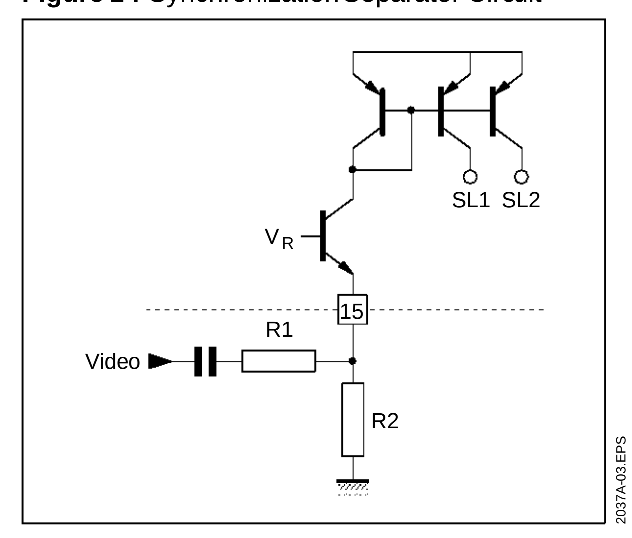
Symbol	Parameter	Min.	Typ.	Max.	Unit
FRAME OUTPUT (PIn 8)					
	Saturation Voltage to Ground (V_7 = 30V)				
LV8A	I_8 = 0.1		0.0.6	0.6	V
LV8B	I_8 = 1A		0.37	1	V
	Saturation Voltage to V_7 (V_7 = 30V)				
HV8A	I_8 = -0.1		1.3	1.6	V
HV8B	I_8 = -1A		1.7	2.4	V
	Saturation Voltage to V7 in Flyback Mode ($V_8 > V_7$)				
FV8A	I_8 = 0.1		1.6	2.1	V
FV8B	I_8 = 1A		2.5	4.5	V
FLYBACK GENERATOR (Pins 2 and 3)					
	Flyback Transistor on (output = high state) (V_2 = 30V)				
F2DA	V3/2 with $I_{3 \rightarrow 2}$ = 0.1A		1.5	2.1	V
F2DB	$I_{3 \rightarrow 2}$ = 1A		3.0	4.5	V
FSVA	V2/3 with $I_{3 \rightarrow 2}$ = 0.1		0.8	1.1	V
FSVB	$I_{3 \rightarrow 2}$ = 1A		2.2	4.5	V
	Flyback Transistor off (output = V_7 - 8V) ($V_7 = V_2$ = 30V)				
FCI	Leakage Current Pin 2			170	µA

2037A-05.TBL

The TEA2037A performs all the video and power functions required to provide signals for the direct drive of the line darlington and frame yoke.

It contains :
- A shunt regulator
- A synchronization separator
- An integrated frame separator without external components
- A saw-tooth generator for the frame
- A power amplifier for direct drive of frame yoke (short circuit protected)
- An open collector output for the line darlington drive
- A line phase detector and a voltage control oscillator

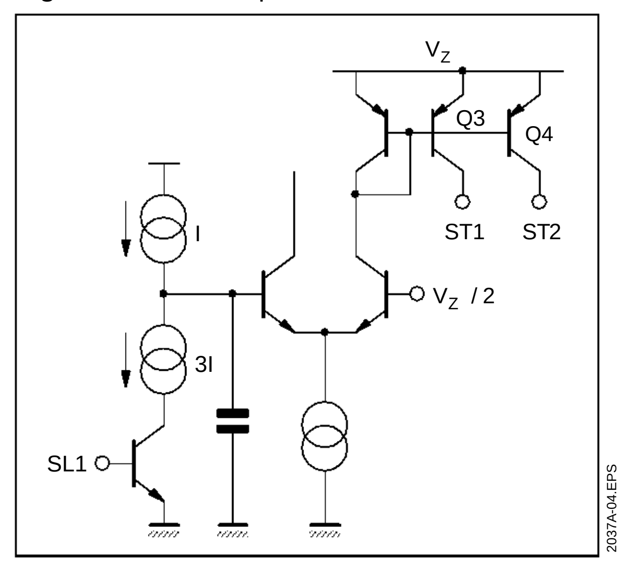
Figure 1 : Synchronization Separator Circuit



The slice level of sync-separation is fixed by value of the external resistors R_1 and R_2. V_R is an internally fixed voltage.

The sync-pulse allows the discharge of the capacitor by a 2 x 1 current. A line sync-pulse is not able to discharge the capacitor under $V_Z/2$. A frame sync pulse permits the complete discharge of the capacitor, so during the frame sync-pulse Q3 and Q4 provide current for the other parts of the circuit.

Figure 2 : Frame Separator



The oscillator thresholds are internally fixed by resistors. The discharge of the capacitor depends on the internal resistor R4. The control voltage is applied on resistor R5.

Figure 3 : Line Oscillator

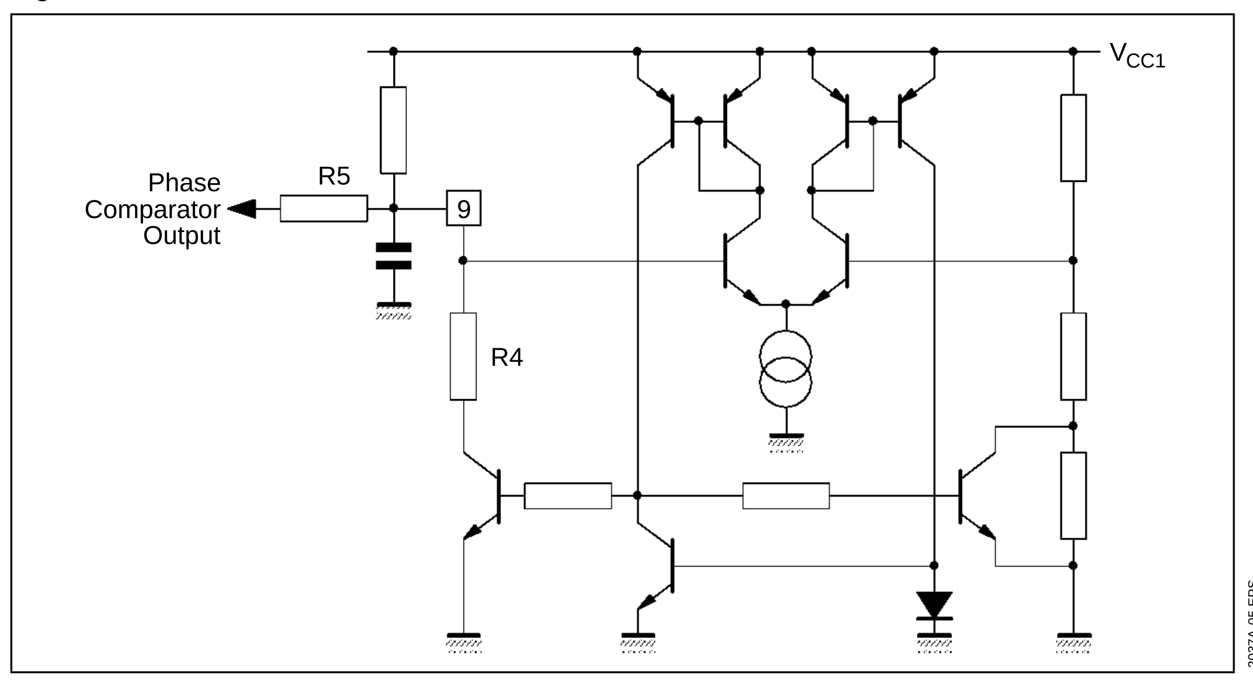
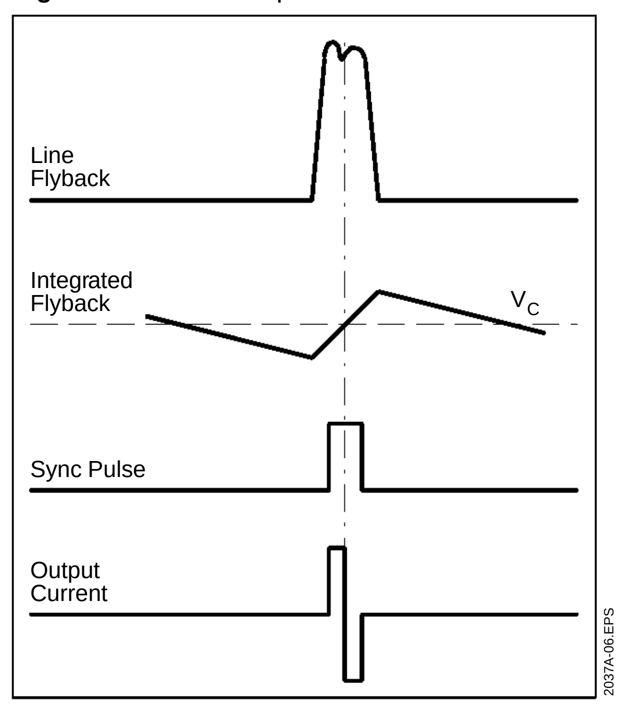
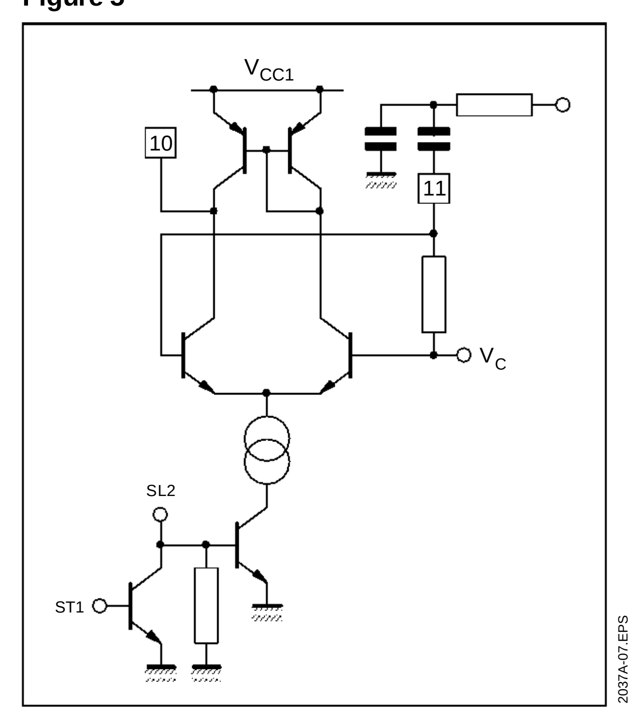


Figure 4 : Phase Comparator



The sync-pulse drives the current in the comparator. The line flyback integrated by the external network gives on pin 11 a saw tooth, the DC offset of this saw tooth is fixed by VC. The comparator output provides a positive current for the part of the signal on pin 11 greater than to VC and a negative current for the other part. When the line flyback and the video signal are synchronized, the output of the comparator is an alternatively negative and positive current. The frame sync-pulse inhibits the comparator to prevent frequency drift of the line oscillator on the frame beginning.

Figure 5



Line Output (pin 14)

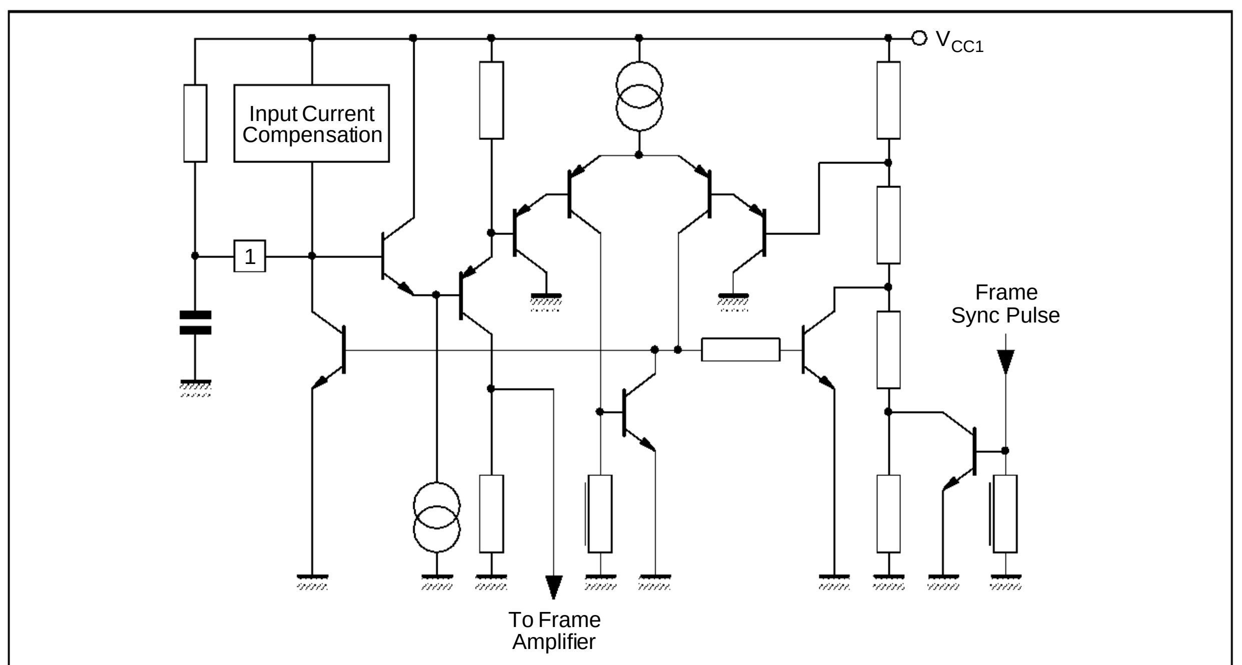
It is an open collector output which is able to drive pulse current of 800mA for a rapid discharging of the darlington base. The output pulse time is 22µs for a 64µs period.

The oscillator thresholds are internally fixed by resistors. The oscillator is synchronized during the last half free run period. The input current during the charge of the capacitor is less than 100nA.

Frame Output Amplifier

This amplifier is able to drive directly the frame yoke. Its output is short circuit and overload protected ; it contains also a thermal protection.

Figure 6 : Frame Oscillator



TYPICAL APPLICATION FOR DISPLAY UNITS

Figure 7 : Application without flyback generator and with sync-pulse drive ; yoke : 72mH, 40W

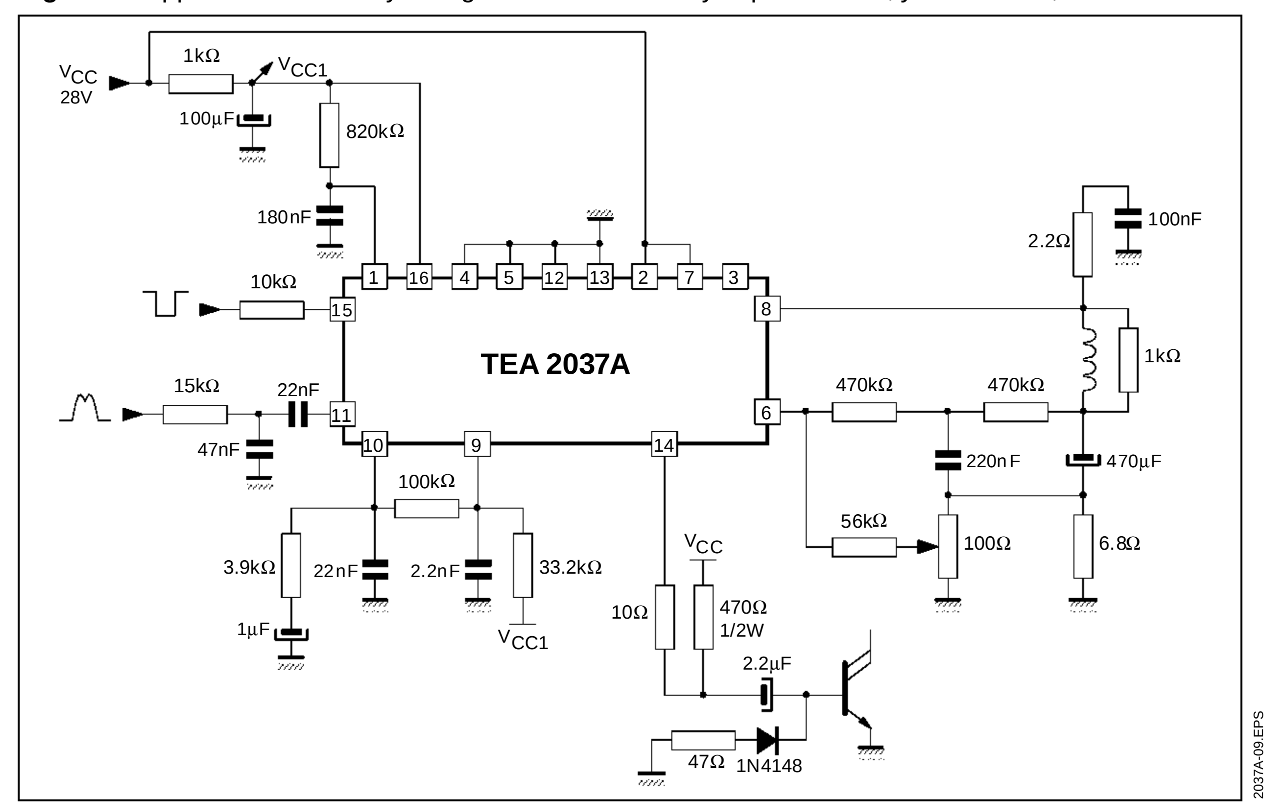
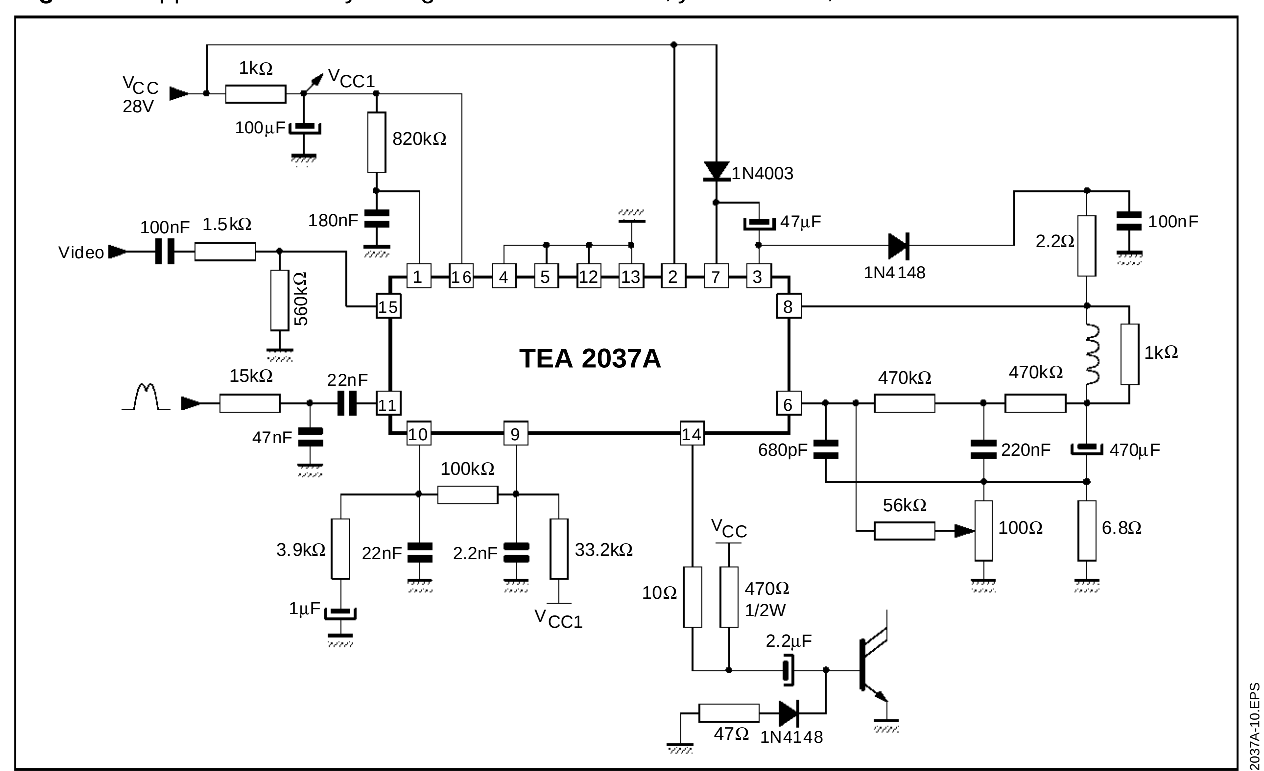


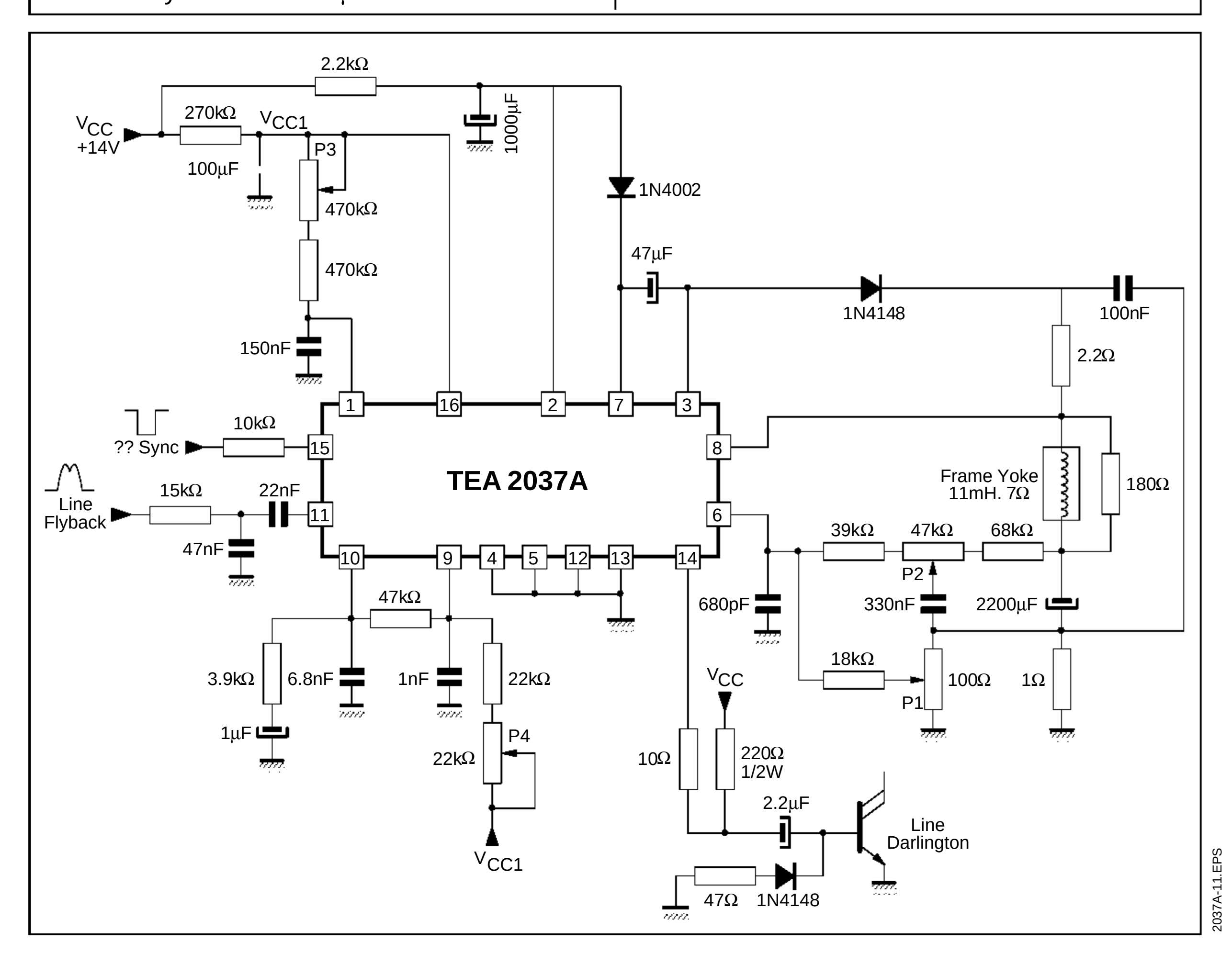
Figure 8 : Application with flyback generator and video ; yoke : 72mH, 40W



TYPICAL APPLICATION FOR HIGH FREQUENCY MONITOR

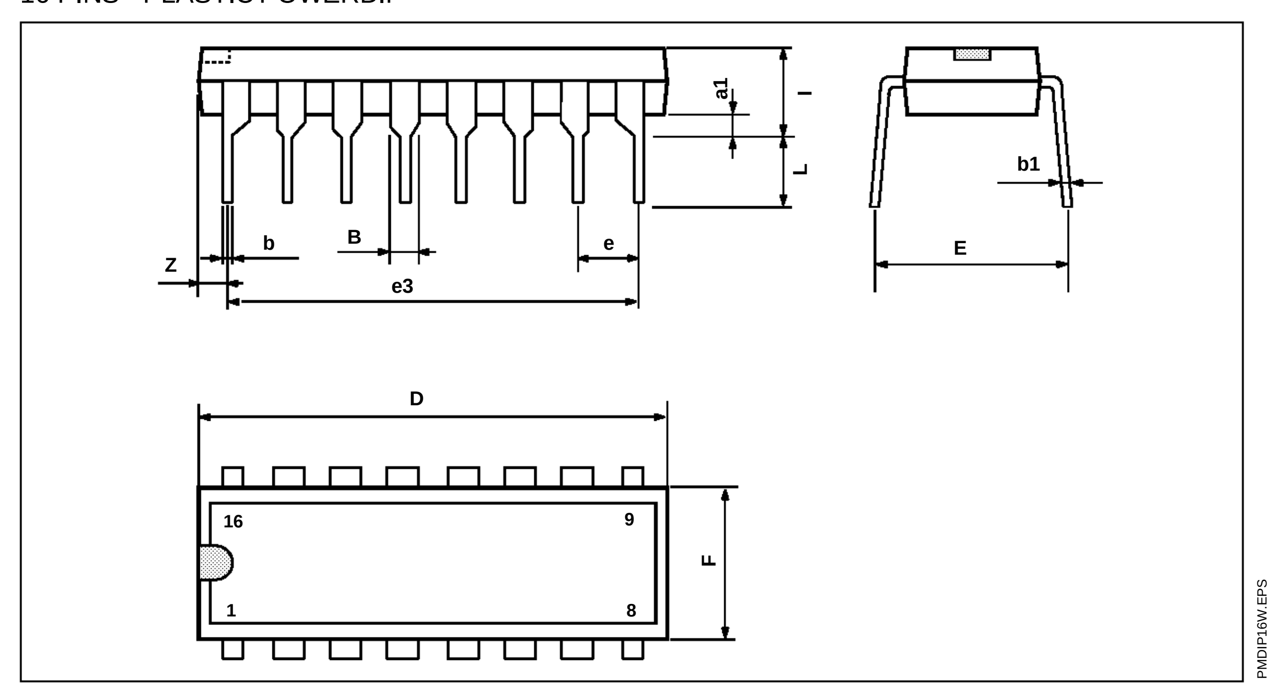
CHARACTERISTICS

- Screen : 14'' Colour
- Frame deflection yoke : 11mH, 7Ω, 750mA peak–to–peak
- V_{CC} = + 14V with flyback generator
- Frame flyback time : 0.6ms
- Vertical frequency : 72Hz
- Vertical free–running period : 16ms (adjustable)
- Horizontal frequency : 35kHz (adjustable)
- Line flyback time : 5.5µs
- Capture range : ± 5µs (@ sync pulse = 4.7µs)
- Input signal : negative TTL sync (line + frame)
- Dissipated power : 1.4W (heatsink required)
- Adjustments :
  - Vertical amplitude
  - Vertical Linearity
  - Vertical frequency
  - Horizontal frequency



PACKAGE MECHANICAL DATA

16 PINS - PLASTIC POWERDIP



Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
a1	0.51			0.020		
B	0.85		1.4	0.033		0.055
b		0.5			0.020	
b1	0.38		0.5	0.015		0.020
D			20			0.787
E		8.8			0.346	
e		2.54			0.100	
e3		17.78			0.700	
F			7.1			0.280
i			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050

DIP16PW.TBL